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ABSTRACT

The purposes of this study were to examine (1) the extent to which three-year-old children converged noncontent speech to that of adults and (2) whether a talkativeness-reticence factor influenced the degree of convergence. Four three-year-old girls individually interacted with six to eight unfamiliar adults in free-play settings. From videorecordings and verbatim transcripts, the degree of children's convergence to adult speech (moves toward similarity) was assessed on dimensions of speech rate, response latency, utterance length, and number of utterances. Three conclusions were drawn from the results: (1) at age three, noncontent speech convergence was evident, although the convergence mechanism was still relatively unstable; (2) talkative children were better able to adapt to the speech of different conversational partners than were reticent children; and (3) adults tended to compensate for a child's lack of conversational activity by talking more to maintain the flow of interaction. (Author/HOD)

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Noncontent Speech Convergence Among Talkative and Reticent Three Year-olds

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Noncontent Speech Convergence

Among Talkative and Reticent Three Year-olds

Interactants tend to make their speech more similar, or converge[1] to one another. Speech convergence has been documented among pause and utterance durations,[2] speech rate,[3] vocal intensity,[4] accent,[5] language choice,[6] and self-disclosure.[7] Excluding self-disclosure, these behaviors are often called noncontent speech[8] in that they refer to "how" speech is produced rather than "what" is said.

Convergence in Children's Noncontent Speech

The preponderance of evidence indicates the noncontent speech convergence mechanism is very stable in adults.[9] A tendency to response match also appears very early in life. Two explanations have been offered to account for this phenomenum. Martin L. Hoffman suggests children's mimicry of other's behaviors may be innate, unlearned responses for experiencing their environment.[10] Thus, one would expect evidence of convergence to appear almost from birth. There are moderate to strong correlations between infants' (1 to 12 months) pitch levels[11] and vocalizations[12] with those of adult partners.

Though agreeing it probably is an automatic process with little or no communicator awareness,[13] other scholars claim noncontent speech convergence is a learned skill which facilitates smooth and effective conversation, enhancing communicative effectiveness,[14] social integration,[15] attraction,[16] and maintenance of desired expressive behavior levels.[17] Additionally, Joan Welkowitz, Gerald Cariffe, and Stanley Feldstein argue that speech pattern matching is a skill that improves with age.[18] Compared to older children or adults, young children often attempt to make some speech adjustments toward

listeners on syntactic and paralinguistic levels[19] but may lack the desire or stable structures for monitoring social activity to allow consistent performance.[20] In support of this, Welkowitz et al. reported that, in same-aged pairs, older children (ages 6.4 to 7.2. years) increased similarity of pause duration moreso than younger children (ages 5.4 to 6.1 years).[21] In a study of children varying in age from 3 to 5, Catherine Garvey and Mohamed BenDebba observed that chidren's ages were positively related to their degree of convergence toward partners' number of utterances in dyadic pairs.[22] Thus, there is some evidence that convergence ability increases with age.

In short, previous research indicates that, regardless of whether the desire to converge noncontent speech is innate or acquired, the ability to do so reflects a social skill. Since speech pattern matcing is other influenced and apparently improves with age, Welkowitz et al. claim such adaptations index a child's degree of socialization.[23] That is, convergence represents socialized speech since it consists of adjustments toward a listener's speech characteristics.

Talkativeness and Reticence

The possibility that noncontent speech convergence ability parallels sociocentric development in children warrants additional research using other indicators of socialization other than age.[24] A promising variable is a child's degree of talkativeness/reticence.[25] The talkativeness/reticence dimension assesses socialization in that it reflects a child's propensity to engage in social discourse. Though reticent and talkative children may not significantly vary in their linguistic knowledge,[26] their communication

performances often reveal differences. First, by definition, a quiet child talks less, thus practices less. Several writers suggest that practice enhances a child's ability to process information[27] and makes language features more stable.[28] Second, as James McCroskey argues, the highly communication apprehensive (a subconstruct of reticence) child possibly has developed lower levels of communication skills because of limited communicative experiences.[29] For example, compared to reticent ones, talkative children often display more advanced lexical and discourse features of language, such as greater lexical diversity, more appropriate conversational contributions (e.g. responding to questions, asking questions, initiating topics), and more diversity among speech acts (i.e. greater balance among requestives, assertives, obliges, comments, etc.).[30]

In sum, noncontent speech convergence appears indicative of a skill which facilitates conversational interaction. The research reviewed suggests convergence ability follows developmental patterns; that is, becomes more apparent as children grow older, or acquire more sociocentric orientations. A child's willingness to engage in social activity is yet another approach to estimating socialization level. Whether due to practice and/or more experience, talkative children are often more proficient with social discourse than their reticent counterparts. For these reasons, we expect greater noncontent speech convergence among talkative rather than reticent children.

Research Questions

The purpose of this study was to offer exploratory data on speech convergence of young children. Three year-olds were examined because (1) the researchers were interested in early development of speech pattern

matching and (2) this is the minimum age at which phonological and syntactic skills are sufficiently advanced to allow meaningful study of noncontent speech behaviors accompanying them. The children's degree of talkativeness was quasi-experimentally manipulated to determine if desire to participate and practice in social interaction enhance convergence ability. Specifically, two questions were examined: (1) to what extent do three-year old children converge noncontent speech to that of adult partners? and (2) does a talkativeness/reticence factor influence children's degree of convergence?

Method

Subjects

Children. Four 3½ year-old girls served as subjects. Two of the children, Jenny and Anne, had participated in another study where it had been informally noted that they differed in the amount of talk they each contributed to spontaneous conversations. Two other children were selected by preschool teacher report. The teacher was asked to generate a list of talkative and quiet three year-olds. The second two subjects, Nikki and Cristi, were randomly chosen from the list. Following data collection, a post hoc definition of the talkative/reticent dimension was formulated on the basis of average number of child utterances per 100 adult utterances across 6 to 8 interactions per child. Consistent with informal and teacher reports, the most talkative child was Nikki ($\bar{X}$ = 92 utterances) followed by Jenney ($\bar{X}$ = 63), Cristi ($\bar{X}$ = 40), and Anne ($\bar{X}$ = 36).

The results of several standardized tests indicated all four children were developing language structure normally for their age level. Each child scored within one standard deviation of the mean for her age on tests of receptive vocabulary (Dunn Picture Vocabulary Test),[31] receptive syntax (Test for Auditory Comprehension of Language),[32] and spontaneous expressive

language (developmental sentence scoring procedure presented in Developmental Sentence Analysis).[33]

Adults. The investigators chose to use adults as the children's partners for two reasons. First, relative to children, adults have faster information processing capacities and more routinized speech patterns.[34] Thus, they should be more consistent and competent performers than other children whose speech performances are more variable.[35] Second, adults could more easily exert control in the event that the children moved beyond the camera's viewing angle or attempted to dispose of the collar-mounted microphones.

Young adult women under age 30 served as the children's partners. These women were college educated and spoke standard English. Each had experience interacting with young children since they were either graduate students in speech pathology or mothers.

Procedure

Convergence is generally a product of mutual speech moficiation by interactants. Since we were interested in the children's adaptations, the study was designed to elicit data representative of the child's speech adjustments. First, each child interacted with 6 to 8 previously unfamiliar adults (Nikki and Cristi participated in 6 and Jenny and Anne in 8 dyads). Second, convergence scores were calculated for each child. Thus, the design emphasized the individual child's speech responses to those of different adults. Finally, implicit in this study is the assumption that the adults' speech behavior would be relatively consistent across children. To test this belief, analyses of variance were conducted on adults' performances of each behavior,

treating the four children as levels of a between-subjects factor. Non-significant results would indicate that adult speech to different children did not vary meaningfully.

Each child-adult interaction lasted 30 minutes and took place in a small room at a university speech and hearing clinic. Prior to each session the adult was told simply to interact naturally with the child for the duration of the half hour session. A few toys were placed in the room. The investigators were not present during the play session. Each session was video-recorded using a camera mounted in the room that operated either from behind one-way observational mirrors or from a control room.

Data

Typically, speech pattern matching is examined by correlating speech behaviors within a particular time unit over successive time units.[36] For example, in dyads in which speech rate is being examined, rates are calculated for each partner per five minute period, then correlated over 20 minutes, or four time periods. This approach did not seem efficacious for this study because of differences among children in amount of talk. That is, in a five minute period, a talkative child may produce 30 utterances whereas a reticent child may utter five. For this reason, the speech variables were claculated for conversational turns, which begin the instance "one participant in a conversation starts talking alone and ends immediately prior to the instant another person starts talking alone."[37] Though it took more time to garner the same number of turns for reticent as opposed to talkative children, the talk sample was more balanced than if time units were used.

Interactants' noncontent speech performances were computed for three consecutive 15 turn segments, for a total of 45 turns. For example, for each

participant in an interaction, three speech rates were assessed corresponding to three 15 turn segments. In addition, an average for the entire interaction was calculated for each interactant. Time required for acquisition of 45 turns ranged from 10 to 20 minutes.

Each interaction was transcribed verbatim from videotapes. Coders were instructed to write down and punctuate what they heard, and to use rising and falling intonation patterns to mark utterance boundaries.[38]

Noncontent Speech Behaviors

Noncontent speech behaviors were computed by two coders using stop watches and following transcripts and videotapes.

Speech rate. Rate was measured in syllables per minute,[39] and calculated for each subject per fifteen turn segment. Since partipants were engaged in play, extended periods of silence were sometimes evident within a turn. Therefore, within turn pauses longer than two seconds were extracted from the total articulation time.

Reponse latency. Response latency is defined as the "length of interval between the beginning of a pause heard by a listener and the beginning of a reply."[40] The time between turns is attributed to the forthcoming speaker.

Utterance number. From the transcripts, utterances were counted for each participant per interaction.

Utterance length. This is generally measured by words or morphemes per utterance. In this study, however, some vocalizations were "play talk" such as "grrr," "ruf, ruf," and "yumma." For this reason, utterance length was measured in syllables per utterance.

Noncontent Speech Convergence

Moves toward speech pattern similarity or convergence in conversation has been generally established by assessing participants' behavior matching ability over several occasions,[41] across groups of dyads,[42] or for a speaker with a particular partner.[43] In conversation, a person can respond toward speech characteristics of different partners (e.g. to partners that have different speech rates) and to behavior changes within an interaction with same partner. In this study, convergence across and within conversations were examined. For each interaction, convergence was measured by computing correlation coefficients of participants' speech behavior over the three 15 turn segments. Thus, for each dyad and behavior, a within-interaction convergence score was computed. Across-interaction scores were acquired by correlating child and adult speech behavior means per interaction across all interactions. Thus, for each speech behavior, every child had one coefficient representing degree of across-conversation convergence.

Noncontent speech convergence is typically measured by the intra-class correlation which is appropriate when only one variate, e.g. pause duration, is being correlated.[44] As Feldstein and Welkowitz note, this coefficient represents similarity not only of shapes of distributions, but also similarity of means.[45] Use of this statistic assumes interactants are equally capable of matching each others' behaviors. With 3 year-olds, this assumption is tenuous. Because their speech patterns are not as learned or habituated as adult's, a young child's speech consists of more hesitations and pauses thus slower rates and longer latencies.[46] In addition, a three-year old's language complexity, as reflected by mean length of utterance, will certainly be less than that of an adult. These claims were upheld in this study. The adults had faster rates, shorter latencies, longer and more utterances than the

children. The only exception was Jenny, the most talkative child, who performed similarly to (but still somewhat below) adults on speech rate and utterance length. Since the data were bivariate in nature, the Pearson product-moment was used to measure convergence. A positive correlation, then, does not represent matching of behaviors but changes in a similar direction, e.g., the child increasing rate toward a faster talking adult.

Results

Reliabilities

Reliability of data coding was established by recomputing behavior scores of six randomly selected interactants (3 adults and 3 children). Intraclass correlations indicated test-retest reliabilities of .81 for speech rate, .88 for response latency, .98 for utterance number, and .89 for utterance length. All were sufficient for further analysis.

Across-Interactions

Speech rate. Adult speech rate to different children did not significantly vary ($F(3,24) = 1.53$). As expected, the most talkative child, Nikki, converged most across speakers ($r = .92$, see Table 1).

Insert Table 1 About Here

The most reticent, Anne, not only converged least, but diverged with slower rates to faster-speaking adults ($r = -.79$). This latter finding is surprising and perhaps reflects Anne's aversion to interaction with an unfamiliar adult.[47] Speech rates of the other two children were positively associated with adult rates (.75 and .79).

Response latency. Adult response latencies to individual children were not significantly different ($F(3,24) = .75$). As indicated in Table 2, there

were relatively strong positive relationships between adult

Insert Table 2 About Here

and child response latencies. The correlations were highest for the two most talkative children (.76 and .85) and lowest for the two most reticent (.25 and .67).

Utterance length. Adult utterance lenfth did not significantly vary across children ($F(3,24) = .62$). As revealed in Table 3, adult utterance length was positively related to those of Nikki (.52), Jenny (.80), and Anne (.69). The correlation for Cristi was slightly negative (-.28).

Utterance number. The number of adult utterances to different children approached significance ($F(3,24 = 2.63$, p .1). There was a tendency for adults to produce more utterances to the reticent children. In addition, all correlations between adult and child utterance number were negative, ranging from -.87 to -.31 (see Table 4). This finding is discussed later in terms of

Insert Table 4 About Here

adult compensation for children's conversational inactivity for the purpose of regulating optimal interaction levels.

Within-Interactions

Table 5 presents the number and percentage of interactions in which

Insert Table 5 About Here

children achieved correlations greater than .4 to adult speech behaviors. The within interaction data tended not to discriminate talkative from reticent children. Excluding utterance number, the speech behavior of all children (except Cristi on speech rate) was moderately to strongly related to that of adults' in at least 50 percent of the interactions. For utterance number, however, percentages ranged from 0 - 38 percent.

Discussion

The purpose of this study was (1) to examine the extent to which three year-olds converged their noncontent speech to adults' and (2) whether a talkativeness-reticence factor influenced degree of convergence.

Convergence of Three Year-olds

All children showed evidence of convergence. This was most obvious in the across-interaction scores for speech rate, response latency, and utterance length. As seen in Tables 1, 2, and 3, most of the relationships were strong with convergence scores larger than .65. As predicted, the children moved their speech styles toward that characteristic of adult partners (exceptions being Anne on rate and Cristi on utterance length). However, for utterance number correlations were consistently negative. This finding is discussed later in terms of adult compensation.

Within-interaction performances were more inconsistent. Percentage of correlations greater than .4 was greatest for response latency (62%), followed by speech rate (58%) and utterance length (54%). Similar to the across conversation data, evidence of within-interaction convergence was poorest for utterance number (18%, see Table 5).

If children's ability to match noncontent speech increases with age, it seems these three year-olds have not yet fully developed the mechanism for converging speech. In this study, these structures were most stable for interactions with different partners than for partner speech changes within a particular interaction. Perhaps the subtleties of within-interaction speech variations require more refined monitoring and production skills than the speech style characteristics of different interlocuters.

These results, then, coupled with previous research, indicate the developmental pattern of convergence competence varies with different behaviors. At what stage in life pattern matching of various noncontent speech behaviors occurs probably depends on several factors, including the communicator's information processing abilities, speech production skills, social knowledge, and the extent to which converging a particular behavior facilitates interaction. For example, vocal pitch variation is probably relatively easy to monitor and produce since it is a physical feature of the voice. Thus, as we reported earlier, children are capable of converging pitch soon after birth. On the other hand, speech timing and tempo, influenced by behaviors such as pauses and articulation rate, are significant features of interaction.[48] Before communicators can adapt toward an interlocuter's response latencies and speech rate, they must be able to orally produce utterances and know basic conversational rules, e.g. turn-taking sequences. Convergence on this level, then, occurs later in childhood. The three year-olds in this study adjusted their latencies and rates though somewhat inconsistently. As discourse abilities improve with age, these convergence skills become more stabilized, as demonstrated by the Welkowitz et al. study.

Finally, the children performed most poorly at matching adult utterance length (excluding, of course, utterance number). This could be attributed to two factors. First, compared to other behaviors examined here, adapting utterance length requires a relatively more advanced skill, the ability to manipulate syntax. These young children were probably least developed on this dimension. Second, utterance length convergence may not be a crucial

feature of interaction maintenance or may be influenced by situational variables such as status and type of interaction.[49] Even adult interactants frequently fail to adapt toward each others' utterance lengths.[50] Clearly, more research on such issues is warranted.

Talkativeness-Reticence

The influence of talkativeness was greatest across interactions. With the exception of utterance number, correlations of child to adult speech were positive and relatively strong (.52 to .92) for the two most talkative girls. The two most reticent were inconsistent with coefficients ranging from -.70 to .79. The results offer initial support for the claim that talkative children, either because of practice or a predisposition toward social interaction, are more proficient at adapting to different partners' noncontent speech features than are reticent children. These data are congruent with the notion that noncontent speech convergence ability improves as a child's level of socialization increases. However, within interactions these differences are not so marked. The two talkative children produced positive correlations greater than .4 in 52 percent whereas the two reticent children did in 45 percent of the interactions. Though mostly speculation, this lack of meaningful difference among children may be due to limited abilities characteristic of their age level.

There are at least two mediating factors which could account for the positive relationship between socialization (as measured by either age or talkativeness) and convergence: desire to communicate or cognitive skill.[51] The first seems less likely for several reasons. First, social will to interact appears early in childhood while ability tends to lag behind.[52]

Second, the children in this study did not respond nonverbally (e.g. frowns, crying, body shifts away from the adult) to indicate apprehension with the interaction. Third, if reticent children were aversive to talking with strange adults, there would be more evidence for dissimilar or divergent speech moves since such adjustments reflect lack of attraction or dissocation.[53] In this study, negative within-interaction scores were relatively evenly dispersed for both groups of children. Across-interactions, the only negative scores on speech rate and utterance length were produced by reticent children. However, this was the exception rather than the rule since the quiet girls did converge more than diverge (see Tables 1-4).

Adult Compensation for Children's Verbal Output

The pattern of results for number of utterances was essentially opposite that of other speech dimensions. Across-interaction scores ranged from -.31 to -.87. Twenty of 28 interactions (71 percent) were individually characterized by negative coefficients. In addition, recall that variation in adult utterance number to different children approached significance ($p < .1$). The most parsimonious explanation is that adults were compensating for verbal output differences among children. That is, increases (or decreases) in a child's utterance number lead to decreases (or increases) in adult utterances.[54] Adults tended to talk more to reticent (53.11 and 53.54 utterances per 15 turn segments) than to talkative children (24 and 30.67 utterances). Perhaps either to avoid long periods of silence, let a talking child retain the floor, or elicit more talk from a quiet child, adults modified their frequency of contributions in the opposite direction to that of the child.

Future Research

Though the data is exploratory, it suggests several directions for future research of adult-child speech patterns. First, the talkative-reticence

dimension seems an influential factor warranting follow-up studies with larger samples of children. Second, study of the developmental progression of convergence performance is called for. As noted, some behaviors may be converged at earlier ages (e.g. vocal pitch) than others (e.g. utterance length). Third, the notion of compensatory adjustments needs further study. Though the discrepancy between adult and child speech was sometimes noticeable for all behaviors, only utterance number reflected inverse relationships. It would appear that matching and compensation are influenced by a complexity of factors including which behaviors are being monitored, the properties of particular speech behaviors, and their social functions. Finally, would a three year-old's pattern matching be similar in interactions with peers as opposed to adults? Differences in status and power may mediate degree of convergence.

Conclusions

Three conclusions are drawn from the results of this study. First, at age 3, noncontent speech convergence is evident though the convergence mechanism is still relatively unstable. Second, talkative children are better able to adapt to the speech of different conversational partners than reticent children. However, within individual interactions, differences between the two groups at age 3 are negligible. Third, adults tend to compensate for a child's lack of conversational activity by talking more to maintain the flow of interaction.

Table 1

Speech Rate Means (spm)

and Correlations of Convergence

teraction	Nicki		Jenny		Cristi		Anne	
	Adult	Child	Adult	Child	Adult	Child	Adult	Child
1.	267	269	448	291	266	221	327	187
2.	232	262	324	276	260	233	273	241
3.	290	304	309	272	246	242	319	171
4.	321	298	398	300	357	321	281	276
5.	324	332	349	246	353	336	312	149
6.	364	346	309	243	320	394	314	155
7.			294	217			338	163
8.			308	239			296	155
	r=.92		r=.75		r=.75		r=.70	

Table 2

Response Latency

Means (sec.) and Correlations

nteraction	Nikki		Jenny		Cristi		Anne	
	Adult	Child	Adult	Child	Adult	Child	Adult	Child
1.	.74	.88	.81	1.22	.56	.92	.51	1.35
2.	.88	1.21	.70	1.01	1.12	1.25	.86	1.23
3.	.52	.92	.63	1.04	.87	1.18	.58	.87
4.	.65	1.02	.68	.81	.93	1.70	.38	1.23
5.	.94	1.19	.54	.64	1.10	1.10	1.27	2.08
6.	.84	1.13	.45	.64	.62	1.34	1.12	1.65
7.			.85	1.03			.38	.83
8.			.97	1.03			.50	1.00
	r=.75		r=.85		r=.25		r=.67	

Table 3

Utterance Length (spu)

Means and Correlations

Interaction	Nikki		Jenny		Cristi		Anne	
	Adult	Child	Adult	Child	Adult	Child	Adult	Child
1.	6.59	5.14	5.88	3.43	5.46	1.87	5.27	3.03
2.	5.08	5.84	5.94	3.45	5.24	2.88	4.78	2.69
3.	3.39	3.33	5.35	3.45	5.50	3.00	5.59	4.79
4.	5.62	4.83	5.86	3.75	4.21	3.57	4.49	2.94
5.	4.61	5.46	5.18	2.87	3.92	2.25	5.79	3.75
6.	5.28	5.53	5.35	3.39	5.63	2.19	4.84	3.07
7			5.03	2.77			5.78	3.64
8.			5.45	3.05			4.86	2.38
	r=.52		r=.80		r=-.28		r=.69	

Table 4

Utterance Number

Means and Correlations

Interaction	Nikki		Jenny		Cristi		Anne	
	Adult	Child	Adult	Child	Adult	Child	Adult	Child
1.	32.33	15.33	39.67	15.33	151.00	15.00	33.33	19.33
2.	24.33	18.33	29.33	17.00	40.00	15.33	68.67	16.33
3.	21.33	18.00	34.67	17.33	34.33	15.00	79.00	15.67
4.	24.67	16.33	33.00	18.33	32.67	18.33	27.33	16.00
5.	21.33	34.33	31.00	20.00	29.33	15.33	27.33	15.67
6.	20.00	20.67	27.00	23.00	31.33	15.67	60.00	16.00
7.			22.33	18.33			59.33	17.00
8.			28.33	24.67			73.33	15.33
	r=-.49		r=-.87		r=-.31		r=-.39	

Table 5

Number (and percentage) of Within-Interaction Correlations Greater than .4

Behavior	Nikki (n=6)	Jenny (n=8)	Cristi (n=6)	Anne (n=8)	Mean Percentage per Behavior
Speech Rate	3(50%)	6(75%)	2(33%)	6(75%)	58%
Response Latency	3(50%)	4(50%)	5(63%)	5(83%)	62%
Utterance Length	4(67%)	4(50%)	3(50%)	4(50%	54%
Utterance Number	2(33%)	3(38%)	0	0	18%

Notes

[1] "Convergence" is but one term used to describe interactants' moves toward similar speech styles. See Howard Giles, "Social Psychology and Applied Linguistics," ITL: Review of Applied Linguistics, 35 (1977), 27-40; Michael Natale, "Convergence of Mean Vocal Intensity in Dyadic Communication as a Function of Social Desirability," Journal of Personality and Social Psychology, 32 (1975), 790-804; and Mark L. Knapp, Donald G. Ellis, and Barbara A. Williams, "Perceptions of Communication Behavior Associated with Relationship Terms," Communication Monographs, 47 (1980), 266. Other labels for similar phenomena include "congruence" (Stanley Feldstein, "Interspeaker Influence in Conversational Interaction," Psychological Reports, 22 (1972), 826-828); "synchrony" James T. Webb, "Interview Synchrony: An Investigation of Two Speech Rate Measures," in Studies in Dyadic Communication, ed. Aron W. Siegman and Benjamin Pope (New York: Pergamon Press, 1972), pp. 115-133); "pattern matching" (Louis Cassotta, Stanley Feldstein, and Joseph Jaffe, The Stability and Modifiability of Vocal Characteristics in Stress and Nonstress Interviews, Research Bulletin November 2 (New York: William Alanson White Institute, 1967)); and "symmetry" (Leo Meltzer, William Norris, and Donald Hayes, "Interruption Outcomes and Vocal Amplitude: Explorations in Social Psycholophysics," Journal of Personality and Social Psychology, 18 (1971), 392-402).

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[3] See Frieda Goldman-Eisler, Psycholinguistics: Experiments in Spontaneous Speech (New York: Academic Press, 1968) and Webb, pp. 115-133.

[4] See Natale, pp. 792-802 and Joan Welkowitz, Stanley Feldstein, Mark Finklestein, and Laurence Aylesworth, "Changes in Vocal Intensity as a Function of Interspeaker Influence," Perceptual and Motor Skills, 35 (1972), 715-718.

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[8] Natale, pp. 797-798; Howard Giles and Philip Smith, "Accommodation Theory: Optimal Levels of Convergence," in Language and Social Psychology, ed. Howard Giles and Robert St. Clair (Baltimore: University Park Press, 1979), pp. 53-54, and Richard L. Street, Jr. and Robert Hopper, "A Model of Speech Style Evaluation," in Attitudes Toward Language Variation: Social and Applied Contexts, ed. Ellen B. Ryan and Howard Giles (London: Edward Arnold Press, in press).

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[10] "Empathy, Its Development, and Prosocial Implications," in Nebraska Symposium on Motivation 1977, ed. Charles Keasey (Lincoln: University of Nebraska Press, 1977), pp. 177-178.

[11] See, for example, Philip Liberman, Intonation, Perception, and Language (Cambridge: MIT Press, 1967); R.L. Webster, M.H. Steinhardt, and M.G. Senter, "Changes in Infants' Vocalizations as a Function of Differential Acoustic Stimulation," Developmental Psychology, 7 (1972), 39-43; W. Kessen, J. Levine, and K. Wendrich, "The Imitation of Pitch in Infants," Infant Behavior and Development, 2 (1979), 93-99; and Hede Helfrich, "Age Markers in Speech," in Social Markers in Speech, ed. Klaus Scherer and Howard Giles (Cambridge: Cambridge University Press, 1979), p. 89.

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[13] Webb, pp. 126-127; Natale, pp. 798-801; Howard Giles and Peter Powesland, Speech Style and Social Evaluation (London: Academic Press, 1975), pp. 169-170; and Charels R. Berger, "Self-Consciousness and the Study of Interpersonal Attraction," in Language: Social Psychological Perspectives, ed. Howard Giles, Peter Robinson, and Philip Smith (Oxford: Pergamon Press, 1980), pp. 49-53.

[14] Natale, pp. 801-802.

[15] Giles, 1977, p. 28.

[16] Giles and Smith; Richard L. Street, Jr., "Evaluation of Noncontent Speech Accommodation," Paper presented to the Annual Meeting of the Speech Communication Association, New York, 1980.

[17] Cappella, in press.

[18] "Conversational Congruence as a Criterion of Socialization in Children," Child Development, 47 (1976), pp. 269-270.

[19] Helfrich, p. 92.

[20] Michael D. Lougee, Royal Grueniech, and Willard W. Hartup, "Social Interaction in Same- and Mixed-Age Dyads of Preschool Children," Child Development, 48 (1977), p. 1360.

[21] p. 271.

[22] "Effects of Age, Sex, and Partner on Children's Dyadic Speech," Child Development, 45 (1974), 1160-1161.

[23] p. 271.

[24] Stanley Feldstein and Joan Welkowitz, "A Chronography of Conversation: In Defense of an Objective Approach," in Nonverbal Behavior and Communication, ed. Aron W. Seigman and Stanley Feldstein (Hillsdale, NJ: Lawrence Erlbaum, 1978), p. 369, also make this point.

[25] Reticence ia a global concept and refers to individuals who characteristically remain silent rather than participating in communication. James C. McCroskey, "Oral Communication Apprehension: A Summary of Recent Theory and Research," Human Communication Research, 4 (1977), p. 79.

[26] See Anne Van Kleeck, "A Linguistic Comparison of Talkative and Reticent Three Year Olds," paper presented to the Annual Meeting of the American Educational Research Association, Boston, 1980.

[27] Marilyn Shatz, "The Relationship Between Cognitive Processes and the Development of Communication Skills," in Nebraska Symposium on Motivation 1977, p. 24.

[28] Philip S. Dale, Language Development, 2nd ed. (New York: Holt, Rinehart, and Winston, 1976), p. 139.

[29] p. 80.

[30] Anne Van Kleeck and Richard L. Street, Jr., "Does Reticence Mean Just Talking Less? Qualitative and Quantitative Differences in the Language of Talkative and Reticent Preschoolers," paper to be presented to the Annual Meeting of the American Educational Research Association, Los Angeles, 1981.

[31] L. Dunn (Circle Plains, Minnesota: American Guidance Service, 1959).

[32] E. Carrow (Austin, Texas: Learning Concepts, 1973).

[33] L. Lee (Evanston, Ill.: Northwestern University Press, 1974).

[34] Aron W. Siegman, "The Telltale Voice: Nonverbal Messages of Verbal Communication," in Nonverbal Behavior and Communication, p. 188.

[35] Shatz, p. 24.

[36] See, for example, Jaffe and Feldstein, Matarazzo and Wiens, and Welkowitz et al.

[37] Feldstein and Welkowitz, p. 335.

[38] This procedure is similar to that of Marilyn Shatz and Rochel Gelman, "The Development of Communication Skills: Modifications in the Speech of Young Children as a Function of Listener," Monographs of the Society for Research in Child Development, 38 (1973), 1-37.

[39] See Webb and Goldman-Eisler.

[40] Matarazzo and Wiens, p. 10.

[41] Jaffe and Feldstein.

[42] Natale, and Joan Welkowitz and Stanley Feldstein, "Relation of Experimentally Manipulated Perception and Psychological Differentiation to the Temporal Patterning of Conversation," Proceedings of the 78th Annual Convention of the American Psychological Association, 5 (1970), 387-388.

[43] Matarazzo and Wiens; Natale.

[44] Ernest A. Haggard, Intraclass Correlation and the Analysis of Variance (New York: Dryden Press, 1958), p. 9.

[45] p. 359.

[46] For further discussion, see Sabine Kowal, Daniel C. O'Connell, and Edward J. Sabin, "Development of Temporal Patterning and Vocal Hesitations in Spontaneous Narratives," Journal of Psycholinguistic Research, 4 (1975), 195-207.

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[48] Feldstein and Welkowitz, and Joseph Jaffe and Samuel Anderson, "Communication Rhythms and the Evolution of Language," in Of Speech and Time, ed. Aron W. Seigman and Stanley Feldstein (Hillsdale, NJ: Lawrence Erlbaum, 1979), pp. 17-22.

[49] Thakerar et al., Street and Hopper, Street.

[50] Cappella, in press; Feldstein and Welkowitz; Jaffe and Feldstein.

[51] Lawrence Kohlberg, Judy Yaeger, and Else Hjertholm, "Private Speech: Four Studies and a Review of Theories," Child Development, 39 (1968), 691-736.

[52] Helfrich, p. 89.

[53] Giles and Powesland; Giles, 1977, in press; Street.

[54] Cappella, in press.